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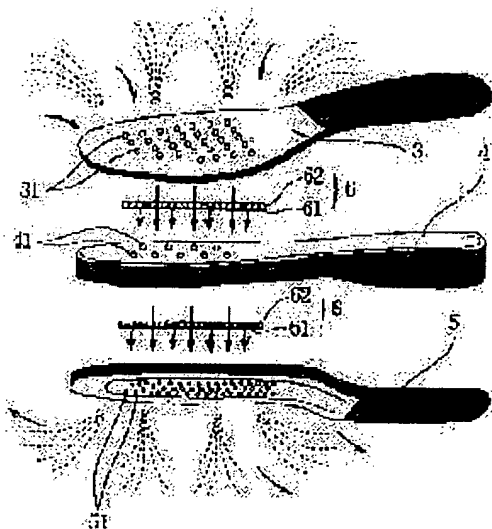
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## (54) SHOE

## (57)Abstract:

PROBLEM TO BE SOLVED: To provide a shoe prevented from water infiltration into the shoe even after long-term use and provided with high air permeability so as to prevent the shoe from getting stuffy by using a material excellent in durability for a water-impermeable air-permeable sheet.

SOLUTION: An outer sole 5 is integrally fastened to an instep part drawn into an inner sole 3, through an inner material 4 by integral sewing with a sewing thread or by bonding with an adhesive. A large number of air holes 31, 41, 51 are bored in the inner sole 3, inner material 4 and outer sole 5, piercing the thickness direction thereof. Air permeable sheets 6 formed of a polymeric composite material of integral structure with the lower face formed of a water-impermeable polyurethane skin layer 61 of communicating porous structure and with the upper face formed of synthetic fiber foundation cloth with high air permeability and extra-high moisture permeability are interposed between the inner sole 3 and inner material 4 and between the inner material 4 and outer sole 5 respectively.



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PRIOR ART

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[Description of the Prior Art] Since outsole lacks permeability in the case of shoes equipped with the above rubber tabulation bottoms, there is a fault of being easy to be steamed. Like a publication in the printing official report of the utility model registration No. 2552714, while drilling many through holes in an insole, there If build the tubed part which has many pores in the peripheral wall of an inside object, the through tube of an insole and the pore of an inside object are made to open for free passage and a wearer's weight acts on shoes, the tubed part of an inside object is compressed and the shoes of the structure where internal air flows in shoes from a through tube and a pore, and prevents \*\*\*\* are proposed.

[0003] As other advanced technology, the shoes of a publication are in JP,7-327706,A, JP,8-294403,A, and JP,9-140404,A. The hole of a large number which a sole (outsole, an inside object, and insole) steps on no these shoes, but are penetrated in the thickness direction into a front part from the section, respectively is drilled, and the permeability sheet (lamination sheet) is stuck on both sides of an inside object (mid sole). A permeability sheet makes the permeability film of non-water permeability an interlayer, and becomes [ section / periphery ] the one side from the three-tiered structure which pasted up and carried out the laminating in a polyester nonwoven fabric with a fine eye about a polyester nonwoven fabric with a coarse eye in an opposite side, respectively.

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TECHNICAL PROBLEM

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[Problem(s) to be Solved by the Invention] However, the room of amelioration is left behind to the above-mentioned conventional shoes at the following points. That is, since the air hole is not prepared in outsole, the shoes of the registration utility model of which the \*\* above was done are difficult for canceling \*\*\*\*, even if air circulates within shoes.

[0005] \*\* Then, since the interlayer of a permeability sheet consists of permeability film of the shape of a film of non-water permeability, shoes given in each above-mentioned patent public presentation official report are very weak, and the reinforcement to hauling or a tear carries out the laminating of the polyester nonwoven fabric to both sides, and is using it as a three-tiered structure to them. And also in the condition of a three-tiered structure, when that in which the points, such as a nail and a needle, sharpened invades from the air hole of outsole, the permeability film is torn simply and there is a possibility that water may invade in shoes. Moreover, since the film-like permeability film is used, it is lacking in endurance, and the permeability film may be damaged for a short period of time, and water may invade. Furthermore, since the laminating of the polyester nonwoven fabric is carried out to both sides of the permeability film of the shape of a film of non-water permeability through adhesives, there is a possibility of lacking permeability.

[0006] By having been made in view of the above-mentioned point, and using the material excellent in endurance for the permeability sheet of non-water permeability, even if it uses it for a long period of time, water cannot trespass upon the interior of shoes easily, and moreover this invention is rich in permeability, and aims at offering the shoes with which \*\*\*\*\* cannot happen easily.

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EFFECT OF THE INVENTION

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[Effect of the Invention] There is the following outstanding effectiveness in the shoes concerning this invention so that clearly from having explained above.

[0032] (1) even if it uses it for a long period of time by using the material excellent in endurance for the permeability sheet of non-water permeability with the shoes of claim 1 -- the interior of shoes -- water -- invading -- hard -- moreover -- permeability -- rich -- \*\*\*\*\* -- happening -- being hard .

[0033] Moreover, although water may invade from the air hole of outsole when you walk along a puddle etc., invasion of water is prevented in the polyurethane epidermis layer under a permeability sheet, and it does not trespass upon the interior. Furthermore, since a permeability sheet consists of macromolecule composite of the integral construction of a polyurethane epidermis layer and the base fabric of a synthetic fiber and it is hard to damage a permeability sheet even if it is strong, and is rich in endurance and it uses it for a long period of time, it is stabilized for a long period of time, and does not let water pass, and the outstanding permeability is held.

[0034] (2) Since shoes claim 2 and given in three equip the inferior surface of tongue of a permeability sheet with the waterproofing moisture permeability polyurethane film layer at one, although they are inferior with permeability, waterproofness has a logical jump with a body, and is especially suitable for it to use in cold districts, such as a snowfall area. In addition, about other effectiveness, it is the same as that of the effectiveness of the shoes of claim 1 almost.

[0035] (3) Since invasion of water is prevented in the polyurethane epidermis layer under [ where shoes according to claim 4 have been arranged on it through the air hole of an inside object even if invasion of water was not fully prevented in the polyurethane epidermis layer under / lower / a permeability sheet ] a permeability sheet, invasion of water is certainly prevented into shoes.

[0036] (4) Since ethylene acetic-acid vinyl foam is used while the inside object under an insole is rich in resiliency by foam, it is very lightweight, and a comfortable walk can be performed, the burden of a guide peg can soften, and shoes according to claim 5 are piles to the fatigue.

[0037] (5) With shoes according to claim 6, since the open air flows smoothly into shoes from the air hole of outsole, the air inside shoes always interchanges, and \*\*\*\* of an unpleasant guide peg cannot happen easily and the amount of moisture does not collect in shoes while the amount of moisture slips out smoothly to a way outside outsole through the air hole of an insole, generating of saprophytic bacteria is suppressed and the inside of shoes is always held cleanly.

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DETAILED DESCRIPTION

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[Detailed Description of the Invention]

[0001]

[Field of the Invention] This invention relates mainly to the structure of shoes where outsole consists of natural rubber, synthetic rubber, polyurethane rubber, etc.

[0002]

[Description of the Prior Art] Since outsole lacks permeability in the case of shoes equipped with the above rubber tabulation bottoms, there is a fault of being easy to be steamed. Like a publication in the printing official report of the utility model registration No. 2552714, while drilling many through holes in an insole, there If build the tubed part which has many pores in the peripheral wall of an inside object, the through tube of an insole and the pore of an inside object are made to open for free passage and a wearer's weight acts on shoes, the tubed part of an inside object is compressed and the shoes of the structure where internal air flows in shoes from a through tube and a pore, and prevents \*\*\*\* are proposed.

[0003] As other advanced technology, the shoes of a publication are in JP,7-327706,A, JP,8-294403,A, and JP,9-140404,A. The hole of a large number which a sole (outsole, an inside object, and insole) steps on no these shoes, but are penetrated in the thickness direction into a front part from the section, respectively is drilled, and the permeability sheet (lamination sheet) is stuck on both sides of an inside object (mid sole). A permeability sheet makes the permeability film of non-water permeability an interlayer, and becomes [ section / periphery ] the one side from the three-tiered structure which pasted up and carried out the laminating in a polyester nonwoven fabric with a fine eye about a polyester nonwoven fabric with a coarse eye in an opposite side, respectively.

[0004]

[Problem(s) to be Solved by the Invention] However, the room of amelioration is left behind to the above-mentioned conventional shoes at the following points. That is, since the air hole is not prepared in outsole, the shoes of the registration utility model of which the \*\* above was done are difficult for canceling \*\*\*\*, even if air circulates within shoes.

[0005] \*\* Then, since the interlayer of a permeability sheet consists of permeability film of the shape of a film of non-water permeability, shoes given in each above-mentioned patent public presentation official report are very weak, and the reinforcement to hauling or a tear carries out the laminating of the polyester nonwoven fabric to both sides, and is using it as a three-tiered structure to them. And also in the condition of a three-tiered structure, when that in which the points, such as a nail and a needle, sharpened invades from the air hole of outsole, the permeability film is torn simply and there is a possibility that water may invade in shoes. Moreover, since the film-like permeability film is used, it is lacking in endurance, and the permeability film may be damaged for a short period of time, and water may invade. Furthermore, since the laminating of the polyester nonwoven fabric is carried out to both sides of the permeability film of the shape of a film of non-water permeability through adhesives, there is a possibility of lacking permeability.

[0006] By having been made in view of the above-mentioned point, and using the material excellent in

endurance for the permeability sheet of non-water permeability, even if it uses it for a long period of time, water cannot trespass upon the interior of shoes easily, and moreover this invention is rich in permeability, and aims at offering the shoes with which \*\*\*\*\* cannot happen easily.

[0007]

[Means for Solving the Problem] The shoes applied to this invention in order to attain the above-mentioned purpose In the shoes which carry out sewing of the outsole to one by sewing thread through an inside object, or come to fix to one with adhesives etc. to \*\*\*\* drawn into the insole The air hole of a large number penetrated in the thickness direction, respectively is drilled in said insole, an inside object, and outsole. The permeability sheet of the macromolecule composite of integral construction with which an inferior surface of tongue consists of a polyurethane epidermis layer which does not let water pass by free passage fine porosity, and a top face consists of a base fabric of the synthetic fiber which has the Takamichi mind and super-high moisture permeability Even if few [ between said insoles and said inside objects and between said inside object and said outsole ], on the other hand (in one case, between an inside object and outsoles is desirable), it is infixing.

[0008] According to the shoes of claim 1 which has the above-mentioned configuration, if a part for a kind of steam generated within shoes has a motion of a wearer's guide peg, it will slip out of it to the method of the outside of an inferior surface of tongue of a sole positively through the air hole of an insole, (the free passage fine porosity of a permeability sheet), the air hole of an inside object, the free passage fine porosity of a permeability sheet, and the air hole of outsole to a single string. Since the open air flows in shoes on the other hand in a path contrary to the case where it slips out of the air hole of outsole and the air in shoes interchanges, the inside of shoes is not steamed with moisture. Moreover, although water may invade from the air hole of outsole when you walk along a puddle etc., invasion of water is prevented in the polyurethane epidermis layer under a permeability sheet, and it does not trespass upon the interior. Furthermore, since a permeability sheet consists of macromolecule composite of the integral construction of a polyurethane epidermis layer and the base fabric of special fiber and it is hard to damage a permeability sheet even if it is strong, and is rich in endurance and it uses it for a long period of time, it is stabilized for a long period of time, and does not let water pass, and the outstanding permeability is maintained.

[0009] In the shoes which carry out sewing of the outsole to one by sewing thread through an inside object to \*\*\*\* according to claim 2 drawn into the insole like, or come to fix to one with adhesives etc. The air hole of a large number penetrated in the thickness direction, respectively is drilled in said insole, an inside object, and outsole. A top face consists of a polyurethane epidermis layer which does not let water pass by free passage fine porosity, and it consists of a base fabric of the synthetic fiber (for example, polyester fiber and nylon fiber) with which an interlayer has the Takamichi mind and super-high moisture permeability. Infix between said insoles and said inside objects or in either [ at least ] between said inside object and said outsole the permeability sheet of the macromolecule composite of integral construction with which an inferior surface of tongue consists of a waterproofing moisture permeability polyurethane film layer, or and like a publication to claim 3 In the shoes which carry out sewing of the outsole to one by sewing thread through an inside object, or come to fix to one with adhesives etc. to \*\*\*\* drawn into the insole The air hole of a large number penetrated in the thickness direction, respectively is drilled in said insole, an inside object, and outsole. A top face consists of a base fabric of the synthetic fiber (for example, polyester fiber and Nay Lynn fiber) which has the Takamichi mind and super-high moisture permeability. An interlayer consists of a polyurethane epidermis layer which does not let water pass by free passage fine porosity. And you may carry out whether the permeability sheet of the macromolecule composite of integral construction with which an inferior surface of tongue consists of a waterproofing moisture permeability polyurethane film layer is infixed between said insoles and said inside objects or in either [ at least ] between said inside object and said outsole.

[0010] Since the inferior surface of tongue of a permeability sheet is equipped with the waterproofing moisture permeability polyurethane film layer at one, although they is inferior, with permeability, waterproofness has a logical jump with a body, and especially, claim 2 or shoes according to claim 3 is

suitable for use in cold districts, such as a snowfall area, and also demonstrates an operation according to claim 1 and the almost same operation.

[0011] Said permeability sheet can be infixed in both between said insoles and said inside objects and between said inside object and said outsole like the publication to claim 4.

[0012] Since invasion of water will be prevented in the polyurethane epidermis layer under [ which has been arranged on it through the air hole of an inside object ] a permeability sheet even if according to the shoes according to claim 4 water invades from the air hole of outsole and invasion of water is not fully prevented in the polyurethane epidermis layer under a permeability sheet, water does not trespass upon the interior of shoes.

[0013] A thing [ drilling many air holes so that said inside object may be formed from the EVA (ethylene acetic-acid vinyl) foam of independent foaming and it may be / like / open for free passage to the air hole of said insole and the air hole of said outsole, respectively ] according to claim 5 is desirable.

[0014] Since EVA (ethylene acetic-acid vinyl) foam is used while the inside object under an insole is rich in resiliency by foam according to the shoes according to claim 5, it is very lightweight, and a comfortable walk can be performed, the burden of a guide peg can soften, and it is a pile to the fatigue.

[0015] Like the publication to claim 6, while setting [ the aperture of the air hole of said insole ] aperture of the air hole of said outsole to 1-1.5mm for the aperture of the air hole of 1-1.5mm and said inside object around 2mm, it is good to set aperture of the free passage fine porosity of 0.8-1.5mm and said permeability sheet to 10-40 micrometers for the thickness of said permeability sheet.

[0016] Since according to the shoes according to claim 6 the open air flows into the interior of shoes smoothly from the air hole of outsole, the air inside shoes always interchanges, and \*\*\*\* of an unpleasant guide peg cannot happen easily and the amount of moisture does not collect in shoes while the amount of moisture slips out smoothly to a way outside outsole through the air hole of an insole, generating of saprophytic bacteria is suppressed and the inside of shoes is kept clean.

[0017]

[Embodiment of the Invention] Hereafter, the gestalt of operation is explained in detail based on a drawing about the shoes of this invention.

[0018] The shoes of drawing 1 do not step on the decomposition perspective view of the shoes which drawing 1 requires for the example of this invention, and drawing 2, but drawing of longitudinal section of the front location of the section and drawing 3 are the decomposition perspective views of the sole of the shoes of drawing 1.

[0019] As shown in drawing 1, the shoes 1 of this example consist of \*\*\*\* 2 made of oxford, an insole 3, the inside object 4, outsole 5, a permeability sheet 6, and an insole 7 for a heel. Outsole 5 consists of natural rubber or synthetic rubber, and the air hole 51 of a large number which outsole 5 does not step on but are penetrated in the thickness direction between the section and the tiptoe section is drilled. In this example, the aperture of an air hole 51 is around 1.5mm. Moreover, the air hole 41 of a large number which the inside object 4 is formed from the independent foam of ethylene polyvinyl acetate resin by this example, and the inside object 4 does not step on it, but are penetrated in the thickness direction between the section and the tiptoe section is drilled. the aperture of an air hole 41 -- 2mm order -- the number of an air hole 41 -- an air hole 51 -- almost -- one half -- few -- about [ of all the numbers of an air hole 51 ] -- one half is arranged in the air hole 41 and the location open for free passage.

[0020] Moreover, the air hole 31 of a large number which an insole 3 does not step on but are penetrated in the thickness direction between the section and the tiptoe section is drilled. The aperture of an air hole 31 is 1.0-1.5mm, with the air hole 51, is the same number mostly and is arranged about 1/in the location of all the numbers of an air hole 31 which 2 opens for free passage with an air hole 41. And the insole 7 is stuck on the heel of an insole 3.

[0021] Now, since the description part is in the permeability sheet 6 in this invention, if it explains in detail, this permeability sheet 6 is the polyurethane epidermis layer 61 in which an inferior surface of tongue does not let water pass by free passage fine porosity, the aperture of a free passage fine hole will be 10-40 micrometers, and the free passage fine hole of 1200-1800 piece / 1cm<sup>2</sup> will be formed in



coincidence at the time of formation of the epidermis layer 61. Moreover, this example of a synthetic fiber becomes a top face from the macromolecule composite which became integral construction also in the epidermis layer 61 at the same time the particle of polyurethane foam is woven by the base fabric 62 which has the Takamichi mind and super-high moisture permeability mixed in polyester fiber, while polyester fiber is made to become entangled in three dimension. This permeability sheet 6 is a material usable as artificial leather. In that whose thickness of the permeability sheet 6 is 1.2mm Hauling force : 110 - 140 N/cm, tear force:65N, and more than exfoliation force:25 N/cm Flexibility:5 class (200,000 times, 10 degrees C) weatherability which it is by the crookedness test by the flexo testing machine: The 5th class, moisture permeability:2900 g/m<sup>2</sup>/24hr (in the environment of the temperature of 35 degrees C, and 80% of humidity) since there is hygroscopic moisture which is contained in air and discharged at the time of aeration, to the actual condition, it is larger -- more than 4l. [/cm ] permeability 2 hr -- water pressure-proof: -- they are about 800 mmAq(s). this example -- the permeability sheet 6 with a thickness of 0.8mm -- the field of the air hole 51-41 between outsole 5 and the inside object 4 -- moreover, the epidermis layer 61 at the bottom is placed upside down, and is infixed in the field of the air hole 41-31 between the inside object 4 and an insole 3, respectively. Although the free passage fine hole is open in the epidermis layer 61, since it is very small, it lets no waterdrop pass. In addition, since the material of this permeability sheet 6 is marketed by the trade name "EARI (trademark)" from Teijin, Ltd., a base fabric 62 side can also be ground and used for it so that a commercial item may be purchased and it may become predetermined thickness (for example, 0.8mm).

[0022] Although the shoes 1 of this example are constituted as mentioned above, this shoes 1 have the following aeration operations. Namely, if it walks where a guide peg is inserted into shoes 1, and a guide peg is crooked The amount of [ the air in shoes 1 or ] moisture circulates the inside of the base fabric 62 of the permeability sheet 6 from the air hole 31 of an insole 3, as shown in drawing 3 . It passes along the air hole 41 of the inside object 4 from the free passage fine hole of the epidermis layer 61, the inside of the base fabric 62 of the permeability sheet 6 is circulated further, and it is emitted to the exterior through the air hole 51 of outsole 5 from the free passage fine hole of the epidermis layer 61. Moreover, the open air flows in shoes 1 from the air hole 51 of outsole 5 in a path contrary to this. Since the free passage fine hole of the epidermis layer 61 of the permeability sheet 6 will not let water pass although it is going to flood from an air hole 51 if a puddle etc. is walked, and water does not invade and it is equipped especially with the permeability sheet 6 also inside the inside object 4 on the other hand, invasion of the water into shoes 1 is certainly prevented with the permeability sheet 6 of a duplex. Furthermore, although the piece of a metal, \*\*\*\*, etc. may invade from an air hole 51 when a piece of a metal, \*\*\*\*, etc. in which the point sharpened with shoes 1 are trampled Since the epidermis layer 61 of the permeability sheet 6 is strong and it is hard to be torn, invasion beyond it is prevented in the epidermis layer 61, and invasion is prevented for the piece of a metal into which the one half of an air hole 51 invaded from the air hole 51 since the location with the air hole 41 of the inside object 4 had shifted in the base of the inside object 4.

[0023] Moreover, also in the production process of shoes 1, it consists of composite with which the epidermis layer 61 and the base fabric 62 were unified, and the three-tiered structure which pasted up a nonwoven fabric or textile fabrics on the above-mentioned official report at a film layer of non-water permeability like the conventional permeability sheet of a publication is different, and since the permeability sheet 6 is strong and easy also handling, it can cut out and infix it in a predetermined configuration easily.

[0024] Thus, after in this example drawing the perimeter of a lower limit of \*\*\*\* 2 into the periphery section inferior surface of tongue of an insole 3 and fixing with adhesives, he fixes to one the outsole 5 which infixed the inside object 4 in the condition of having equipped the top face with the permeability sheet 6, and the permeability sheet 6 with adhesives, and is trying for the periphery section of the inside object 4 to overflow \*\*\*\* 2 into the method of outside, although a sole is constituted. [0025] Drawing 4 shows the example of the permeability sheet for a cold district, especially snowfall zones. Permeability sheet 6' shown in drawing 4 (a) became the front face of the base fabric 62 of the above-mentioned permeability sheet 6 from the macromolecule composite of the integral construction which carried out

the laminating of the polyurethane film layer 63 of moisture permeability (moisture has the description which it lets pass) with waterproofness (non-water permeability), and has strengthened waterproofness on it. This permeability sheet 6' carries out the reverse sense 61, i.e., a polyurethane epidermis layer, to the case of the above-mentioned example on the top face, uses the polyurethane film layer 63 as an inferior surface of tongue, and infixes it between an insole 3 and the inside object 4 and between the inside object 4 and outsole 5. Since other configurations are common in the shoes 1 of the above-mentioned example, explanation is omitted. And since the permeability sheet 6 equips one with the polyurethane film layer 63 excellent in waterproofness according to the shoes of this example, even if he walks along a snowy road etc., water does not permeate the interior of shoes. On the other hand, although permeability is inferior, since a part for moisture is emitted outside through the polyurethane film layer 63, the interior of shoes cannot be steamed easily.

[0026] The flexibility: class [ 4.5-5th ] (200,000 times, 10 degrees C) weatherability in the crookedness test according at that whose thickness of the permeability sheet 6 is 1.2mm to 135 [ tensile strength: 125 - ] N/cm, tear on-the-strength: 60-65N, more than exfoliation force: 30 N/cm, and a flexo testing machine: They are the 5th class and moisture permeability: abbreviation 3000 g/m<sup>2</sup>/24hr (setting by the environment of the temperature of 40 degrees C, and 90% of humidity).

[0027] Permeability sheet 6" shown in drawing 4 (b) consists of macromolecule composite of the integral construction which carried out the laminating of the polyurethane film layer 63 of moisture permeability (moisture has the description which it lets pass) to the front face of the polyurethane epidermis layer 61 of the above-mentioned permeability sheet 6 with waterproofness (non-water permeability), and waterproofness is strengthened. Like the case of the above-mentioned example, this permeability sheet 6" turns the polyurethane epidermis layer 61 and the polyurethane film layer 63 down, and infixes them between an insole 3 and the inside object 4 and between the inside object 4 and outsole 5. Since other configurations are common in the shoes 1 of the above-mentioned example, explanation is omitted. In addition, since one is equipped with the polyurethane film layer 63 like permeability sheet 6' of the above-mentioned example, compared with the conventional permeability sheet of a publication, it is hard to damage in the above-mentioned patent public presentation official report, and can be used for it for a long period of time, but since the laminating has been carried out to the front face of the polyurethane epidermis layer 61, endurance is further excellent. Moreover, about the other effectiveness, the almost same effectiveness as the shoes which used permeability sheet 6' is expected.

[0028] Although one example of the shoes of this invention was shown above, it can carry out as follows. That is, although the \*\* permeability sheet 6 can be infixes only in one side by the side of the inferior surface of tongue of the inside object 4, or a top face, it is good to infix in the inferior-surface-of-tongue side of the inside object 4 in this case.

[0029] \*\* Since the base fabric 62 of the permeability sheet 6 is woven by the synthetic fiber of polyester fiber in three dimension and the amount of [ air or ] moisture can invade from every location, by making the permeability sheet 6 infix, each location of an air hole 31-41-51 can shift completely, and can prevent invasion into shoes 1 from the air holes 51, such as a nail and a needle, certainly in this case. In addition, the synthetic fiber which carries out \*\*\*\* (a nonwoven fabric is also included) of the base fabric 62 may not be limited to polyester fiber, and nylon fiber is sufficient as it.

[0030] \*\* It is also possible to use a BARUKA ize type process and an injection-molding type process, and to carry out sewing using sewing thread instead of the process which fixes the shell 2 made from a twist and a sole at one to the cement method shown in the above-mentioned example.

[0031]

[Effect of the Invention] There is the following outstanding effectiveness in the shoes concerning this invention so that clearly from having explained above.

[0032] (1) even if it uses it for a long period of time by using the material excellent in endurance for the permeability sheet of non-water permeability with the shoes of claim 1 -- the interior of shoes -- water -- invading -- hard -- moreover -- permeability -- rich -- \*\*\*\*\* -- happening -- being hard .

[0033] Moreover, although water may invade from the air hole of outsole when you walk along a puddle

etc., invasion of water is prevented in the polyurethane epidermis layer under a permeability sheet, and it does not trespass upon the interior. Furthermore, since a permeability sheet consists of macromolecule composite of the integral construction of a polyurethane epidermis layer and the base fabric of a synthetic fiber and it is hard to damage a permeability sheet even if it is strong, and is rich in endurance and it uses it for a long period of time, it is stabilized for a long period of time, and does not let water pass, and the outstanding permeability is held.

[0034] (2) Since shoes claim 2 and given in three equip the inferior surface of tongue of a permeability sheet with the waterproofing moisture permeability polyurethane film layer at one, although they are inferior with permeability, waterproofness has a logical jump with a body, and is especially suitable for it to use in cold districts, such as a snowfall area. In addition, about other effectiveness, it is the same as that of the effectiveness of the shoes of claim 1 almost.

[0035] (3) Since invasion of water is prevented in the polyurethane epidermis layer under [ where shoes according to claim 4 have been arranged on it through the air hole of an inside object even if invasion of water was not fully prevented in the polyurethane epidermis layer under / lower / a permeability sheet ] a permeability sheet, invasion of water is certainly prevented into shoes.

[0036] (4) Since ethylene acetic-acid vinyl foam is used while the inside object under an insole is rich in resiliency by foam, it is very lightweight, and a comfortable walk can be performed, the burden of a guide peg can soften, and shoes according to claim 5 are piles to the fatigue.

[0037] (5) With shoes according to claim 6, since the open air flows smoothly into shoes from the air hole of outsole, the air inside shoes always interchanges, and \*\*\*\* of an unpleasant guide peg cannot happen easily and the amount of moisture does not collect in shoes while the amount of moisture slips out smoothly to a way outside outsole through the air hole of an insole, generating of saprophytic bacteria is suppressed and the inside of shoes is always held cleanly.

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MEANS

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[Means for Solving the Problem] The shoes applied to this invention in order to attain the above-mentioned purpose In the shoes which carry out sewing of the outsole to one by sewing thread through an inside object, or come to fix to one with adhesives etc. to \*\*\*\* drawn into the insole The air hole of a large number penetrated in the thickness direction, respectively is drilled in said insole, an inside object, and outsole. The permeability sheet of the macromolecule composite of integral construction with which an inferior surface of tongue consists of a polyurethane epidermis layer which does not let water pass by free passage fine porosity, and a top face consists of a base fabric of the synthetic fiber which has the Takamichi mind and super-high moisture permeability Even if few [ between said insoles and said inside objects and between said inside object and said outsole ], on the other hand (in one case, between an inside object and outsoles is desirable), it is infixing.

[0008] According to the shoes of claim 1 which has the above-mentioned configuration, if a part for a kind of steam generated within shoes has a motion of a wearer's guide peg, it will slip out of it to the method of the outside of an inferior surface of tongue of a sole positively through the air hole of an insole, (the free passage fine porosity of a permeability sheet), the air hole of an inside object, the free passage fine porosity of a permeability sheet, and the air hole of outsole to a single string. Since the open air flows in shoes on the other hand in a path contrary to the case where it slips out of the air hole of outsole and the air in shoes interchanges, the inside of shoes is not steamed with moisture. Moreover, although water may invade from the air hole of outsole when you walk along a puddle etc., invasion of water is prevented in the polyurethane epidermis layer under a permeability sheet, and it does not trespass upon the interior. Furthermore, since a permeability sheet consists of macromolecule composite of the integral construction of a polyurethane epidermis layer and the base fabric of special fiber and it is hard to damage a permeability sheet even if it is strong, and is rich in endurance and it uses it for a long period of time, it is stabilized for a long period of time, and does not let water pass, and the outstanding permeability is maintained.

[0009] In the shoes which carry out sewing of the outsole to one by sewing thread through an inside object to \*\*\*\* according to claim 2 drawn into the insole like, or come to fix to one with adhesives etc. The air hole of a large number penetrated in the thickness direction, respectively is drilled in said insole, an inside object, and outsole. A top face consists of a polyurethane epidermis layer which does not let water pass by free passage fine porosity, and it consists of a base fabric of the synthetic fiber (for example, polyester fiber and nylon fiber) with which an interlayer has the Takamichi mind and super-high moisture permeability. Infix between said insoles and said inside objects or in either [ at least ] between said inside object and said outsole the permeability sheet of the macromolecule composite of integral construction with which an inferior surface of tongue consists of a waterproofing moisture permeability polyurethane film layer, or and like a publication to claim 3 In the shoes which carry out sewing of the outsole to one by sewing thread through an inside object, or come to fix to one with adhesives etc. to \*\*\*\* drawn into the insole The air hole of a large number penetrated in the thickness direction, respectively is drilled in said insole, an inside object, and outsole. A top face consists of a base fabric of the synthetic fiber (for example, polyester fiber and Nay Lynn fiber) which has the Takamichi

mind and super-high moisture permeability. An interlayer consists of a polyurethane epidermis layer which does not let water pass by free passage fine porosity. And you may carry out whether the permeability sheet of the macromolecule composite of integral construction with which an inferior surface of tongue consists of a waterproofing moisture permeability polyurethane film layer is infixed between said insoles and said inside objects or in either [ at least ] between said inside object and said outsole.

[0010] Since the inferior surface of tongue of a permeability sheet is equipped with the waterproofing moisture permeability polyurethane film layer at one, although they is inferior, with permeability, waterproofness has a logical jump with a body, and especially, claim 2 or shoes according to claim 3 is suitable for use in cold districts, such as a snowfall area, and also demonstrates an operation according to claim 1 and the almost same operation.

[0011] Said permeability sheet can be infixed in both between said insoles and said inside objects and between said inside object and said outsole like the publication to claim 4.

[0012] Since invasion of water will be prevented in the polyurethane epidermis layer under [ which has been arranged on it through the air hole of an inside object ] a permeability sheet even if according to the shoes according to claim 4 water invades from the air hole of outsole and invasion of water is not fully prevented in the polyurethane epidermis layer under a permeability sheet, water does not trespass upon the interior of shoes.

[0013] A thing [ drilling many air holes so that said inside object may be formed from the EVA (ethylene acetic-acid vinyl) foam of independent foaming and it may be / like / open for free passage to the air hole of said insole and the air hole of said outsole, respectively ] according to claim 5 is desirable.

[0014] Since EVA (ethylene acetic-acid vinyl) foam is used while the inside object under an insole is rich in resiliency by foam according to the shoes according to claim 5, it is very lightweight, and a comfortable walk can be performed, the burden of a guide peg can soften, and it is a pile to the fatigue.

[0015] Like the publication to claim 6, while setting [ the aperture of the air hole of said insole ] aperture of the air hole of said outsole to 1-1.5mm for the aperture of the air hole of 1-1.5mm and said inside object around 2mm, it is good to set aperture of the free passage fine porosity of 0.8-1.5mm and said permeability sheet to 10-40 micrometers for the thickness of said permeability sheet.

[0016] Since according to the shoes according to claim 6 the open air flows into the interior of shoes smoothly from the air hole of outsole, the air inside shoes always interchanges, and \*\*\*\* of an unpleasant guide peg cannot happen easily and the amount of moisture does not collect in shoes while the amount of moisture slips out smoothly to a way outside outsole through the air hole of an insole, generating of saprophytic bacteria is suppressed and the inside of shoes is kept clean.

[0017]

[Embodiment of the Invention] Hereafter, the gestalt of operation is explained in detail based on a drawing about the shoes of this invention.

[0018] The shoes of drawing 1 do not step on the decomposition perspective view of the shoes which drawing 1 requires for the example of this invention, and drawing 2 , but drawing of longitudinal section of the front location of the section and drawing 3 are the decomposition perspective views of the sole of the shoes of drawing 1 .

[0019] As shown in drawing 1 , the shoes 1 of this example consist of \*\*\*\* 2 made of oxhide, an insole 3, the inside object 4, outsole 5, a permeability sheet 6, and an insole 7 for a heel. Outsole 5 consists of natural rubber or synthetic rubber, and the air hole 51 of a large number which outsole 5 does not step on but are penetrated in the thickness direction between the section and the tiptoe section is drilled. In this example, the aperture of an air hole 51 is around 1.5mm. Moreover, the air hole 41 of a large number which the inside object 4 is formed from the independent foam of ethylene polyvinyl acetate resin by this example, and the inside object 4 does not step on it, but are penetrated in the thickness direction between the section and the tiptoe section is drilled. the aperture of an air hole 41 -- 2mm order -- the number of an air hole 41 -- an air hole 51 -- almost -- one half -- few -- about [ of all the numbers of an air hole 51 ] -- one half is arranged in the air hole 41 and the location open for free passage.

[0020] Moreover, the air hole 31 of a large number which an insole 3 does not step on but are penetrated in the thickness direction between the section and the tiptoe section is drilled. The aperture of an air hole 31 is 1.0-1.5mm, with the air hole 51, is the same number mostly and is arranged about 1/in the location of all the numbers of an air hole 31 which 2 opens for free passage with an air hole 41. And the insole 7 is stuck on the heel of an insole 3.

[0021] Now, since the description part is in the permeability sheet 6 in this invention, if it explains in detail, this permeability sheet 6 is the polyurethane epidermis layer 61 in which an inferior surface of tongue does not let water pass by free passage fine porosity, the aperture of a free passage fine hole will be 10-40 micrometers, and the free passage fine hole of 1200-1800 piece / 1cm<sup>2</sup> will be formed in coincidence at the time of formation of the epidermis layer 61. Moreover, this example of a synthetic fiber becomes a top face from the macromolecule composite which became integral construction also in the epidermis layer 61 at the same time the particle of polyurethane foam is woven by the base fabric 62 which has the Takamichi mind and super-high moisture permeability mixed in polyester fiber, while polyester fiber is made to become entangled in three dimension. This permeability sheet 6 is a material usable as artificial leather. In that whose thickness of the permeability sheet 6 is 1.2mm Hauling force : 110 - 140 N/cm, tear force:65N, and more than exfoliation force:25 N/cm Flexibility:5 class (200,000 times, 10 degrees C) weatherability which it is by the crookedness test by the flexo testing machine: The 5th class, moisture permeability:2900 g/m<sup>2</sup>/24hr (in the environment of the temperature of 35 degrees C, and 80% of humidity) since there is hygroscopic moisture which is contained in air and discharged at the time of aeration, to the actual condition, it is larger -- more than 4l. [/cm ] permeability 2 hr -- water pressure-proof: -- they are about 800 mmAq(s). this example -- the permeability sheet 6 with a thickness of 0.8mm -- the field of the air hole 51-41 between outsole 5 and the inside object 4 -- moreover, the epidermis layer 61 at the bottom is placed upside down, and is infixed in the field of the air hole 41-31 between the inside object 4 and an insole 3, respectively. Although the free passage fine hole is open in the epidermis layer 61, since it is very small, it lets no waterdrop pass. In addition, since the material of this permeability sheet 6 is marketed by the trade name "EARI (trademark)" from Teijin, Ltd., a base fabric 62 side can also be ground and used for it so that a commercial item may be purchased and it may become predetermined thickness (for example, 0.8mm).

[0022] Although the shoes 1 of this example are constituted as mentioned above, this shoes 1 have the following aeration operations. Namely, if it walks where a guide peg is inserted into shoes 1, and a guide peg is crooked The amount of [ the air in shoes 1 or ] moisture circulates the inside of the base fabric 62 of the permeability sheet 6 from the air hole 31 of an insole 3, as shown in drawing 3 . It passes along the air hole 41 of the inside object 4 from the free passage fine hole of the epidermis layer 61, the inside of the base fabric 62 of the permeability sheet 6 is circulated further, and it is emitted to the exterior through the air hole 51 of outsole 5 from the free passage fine hole of the epidermis layer 61. Moreover, the open air flows in shoes 1 from the air hole 51 of outsole 5 in a path contrary to this. Since the free passage fine hole of the epidermis layer 61 of the permeability sheet 6 will not let water pass although it is going to flood from an air hole 51 if a puddle etc. is walked, and water does not invade and it is equipped especially with the permeability sheet 6 also inside the inside object 4 on the other hand, invasion of the water into shoes 1 is certainly prevented with the permeability sheet 6 of a duplex. Furthermore, although the piece of a metal, \*\*\*\*, etc. may invade from an air hole 51 when a piece of a metal, \*\*\*\*, etc. in which the point sharpened with shoes 1 are trampled Since the epidermis layer 61 of the permeability sheet 6 is strong and it is hard to be torn, invasion beyond it is prevented in the epidermis layer 61, and invasion is prevented for the piece of a metal into which the one half of an air hole 51 invaded from the air hole 51 since the location with the air hole 41 of the inside object 4 had shifted in the base of the inside object 4.

[0023] Moreover, also in the production process of shoes 1, it consists of composite with which the epidermis layer 61 and the base fabric 62 were unified, and the three-tiered structure which pasted up a nonwoven fabric or textile fabrics on the above-mentioned official report at a film layer of non-water permeability like the conventional permeability sheet of a publication is different, and since the permeability sheet 6 is strong and easy also handling, it can cut out and infix it in a predetermined

configuration easily.

[0024] Thus, after in this example drawing the perimeter of a lower limit of \*\*\*\* 2 into the periphery section inferior surface of tongue of an insole 3 and fixing with adhesives, he fixes to one the outsole 5 which infixed the inside object 4 in the condition of having equipped the top face with the permeability sheet 6, and the permeability sheet 6 with adhesives, and is trying for the periphery section of the inside object 4 to overflow \*\*\*\* 2 into the method of outside, although a sole is constituted. [0025] Drawing 4 shows the example of the permeability sheet for a cold district, especially snowfall zones. Permeability sheet 6' shown in drawing 4 (a) became the front face of the base fabric 62 of the above-mentioned permeability sheet 6 from the macromolecule composite of the integral construction which carried out the laminating of the polyurethane film layer 63 of moisture permeability (moisture has the description which it lets pass) with waterproofness (non-water permeability), and has strengthened waterproofness on it. This permeability sheet 6' carries out the reverse sense 61, i.e., a polyurethane epidermis layer, to the case of the above-mentioned example on the top face, uses the polyurethane film layer 63 as an inferior surface of tongue, and infixes it between an insole 3 and the inside object 4 and between the inside object 4 and outsole 5. Since other configurations are common in the shoes 1 of the above-mentioned example, explanation is omitted. And since the permeability sheet 6 equips one with the polyurethane film layer 63 excellent in waterproofness according to the shoes of this example, even if he walks along a snowy road etc., water does not permeate the interior of shoes. On the other hand, although permeability is inferior, since a part for moisture is emitted outside through the polyurethane film layer 63, the interior of shoes cannot be steamed easily.

[0026] The flexibility: class [ 4.5-5th ] (200,000 times, 10 degrees C) weatherability in the crookedness test according at that whose thickness of the permeability sheet 6 is 1.2mm to 135 [ tensile strength: 125 - ] N/cm, tear on-the-strength: 60-65N, more than exfoliation force: 30 N/cm, and a flexo testing machine: They are the 5th class and moisture permeability: abbreviation 3000 g/m<sup>2</sup>/24hr (setting by the environment of the temperature of 40 degrees C, and 90% of humidity).

[0027] Permeability sheet 6" shown in drawing 4 (b) consists of macromolecule composite of the integral construction which carried out the laminating of the polyurethane film layer 63 of moisture permeability (moisture has the description which it lets pass) to the front face of the polyurethane epidermis layer 61 of the above-mentioned permeability sheet 6 with waterproofness (non-water permeability), and waterproofness is strengthened. Like the case of the above-mentioned example, this permeability sheet 6" turns the polyurethane epidermis layer 61 and the polyurethane film layer 63 down, and infixes them between an insole 3 and the inside object 4 and between the inside object 4 and outsole 5. Since other configurations are common in the shoes 1 of the above-mentioned example, explanation is omitted. In addition, since one is equipped with the polyurethane film layer 63 like permeability sheet 6' of the above-mentioned example, compared with the conventional permeability sheet of a publication, it is hard to damage in the above-mentioned patent public presentation official report, and can be used for it for a long period of time, but since the laminating has been carried out to the front face of the polyurethane epidermis layer 61, endurance is further excellent. Moreover, about the other effectiveness, the almost same effectiveness as the shoes which used permeability sheet 6' is expected.

[0028] Although one example of the shoes of this invention was shown above, it can carry out as follows. That is, although the \*\* permeability sheet 6 can be infixed only in one side by the side of the inferior surface of tongue of the inside object 4, or a top face, it is good to infix in the inferior-surface-of-tongue side of the inside object 4 in this case.

[0029] \*\* Since the base fabric 62 of the permeability sheet 6 is woven by the synthetic fiber of polyester fiber in three dimension and the amount of [ air or ] moisture can invade from every location, by making the permeability sheet 6 infix, each location of an air hole 31-41-51 can shift completely, and can prevent invasion into shoes 1 from the air holes 51, such as a nail and a needle, certainly in this case. In addition, the synthetic fiber which carries out \*\*\*\* (a nonwoven fabric is also included) of the base fabric 62 may not be limited to polyester fiber, and nylon fiber is sufficient as it.

[0030] \*\* It is also possible to use a BARUKA ize type process and an injection-molding type process,

and to carry out sewing using sewing thread instead of the process which fixes the shell 2 made from a twist and a sole at one to the cement method shown in the above-mentioned example.

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[Translation done.]



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CLAIMS

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[Claim(s)]

[Claim 1] In the shoes which carry out sewing of the outsole to one by sewing thread through an inside object, or come to fix to one with adhesives etc. to \*\*\*\* drawn into the insole The air hole of a large number penetrated in the thickness direction, respectively is drilled in said insole, an inside object, and outsole. The permeability sheet of the macromolecule composite of integral construction with which an inferior surface of tongue consists of a polyurethane epidermis layer which does not let water pass by free passage fine porosity, and a top face consists of a base fabric of the synthetic fiber which has the Takamichi mind and super-high moisture permeability Shoes characterized by infixing between said insoles and said inside objects or in either [ at least ] between said inside object and said outsole.

[Claim 2] In the shoes which carry out sewing of the outsole to one by sewing thread through an inside object, or come to fix to one with adhesives etc. to \*\*\*\* drawn into the insole The air hole of a large number penetrated in the thickness direction, respectively is drilled in said insole, an inside object, and outsole. A top face consists of a polyurethane epidermis layer which does not let water pass by free passage fine porosity, and it consists of a base fabric of the synthetic fiber with which an interlayer has the Takamichi mind and super-high moisture permeability. And shoes characterized by infixing between said insoles and said inside objects or in either [ at least ] between said inside object and said outsole the permeability sheet of the macromolecule composite of integral construction with which an inferior surface of tongue consists of a waterproofing moisture permeability polyurethane film layer.

[Claim 3] In the shoes which carry out sewing of the outsole to one by sewing thread through an inside object, or come to fix to one with adhesives etc. to \*\*\*\* drawn into the insole The air hole of a large number penetrated in the thickness direction, respectively is drilled in said insole, an inside object, and outsole. A top face consists of a base fabric of the synthetic fiber which has the Takamichi mind and super-high moisture permeability, and an interlayer consists of a polyurethane epidermis layer which does not let water pass by free passage fine porosity. And shoes characterized by infixing between said insoles and said inside objects or in either [ at least ] between said inside object and said outsole the permeability sheet of the macromolecule composite of integral construction with which an inferior surface of tongue consists of a waterproofing moisture permeability polyurethane film layer.

[Claim 4] Shoes according to claim 1 to 3 which infixed said permeability sheet in both between said insoles and said inside objects and between said inside object and said outsole.

[Claim 5] Shoes according to claim 1 to 4 which drilled many air holes so that said inside object might be formed from the ethylene acetic-acid vinyl foam of independent foaming and it might be open for free passage to the air hole of said insole, and the air hole of said outsole, respectively.

[Claim 6] Shoes according to claim 3 to 5 whose aperture of the free passage fine porosity of 0.8-1.5mm and said permeability sheet the thickness of said permeability sheet is [ the aperture of the air hole of said insole / the aperture of the air hole of 1-1.5mm and said inside object ] 10-40 micrometers in 1-1.5mm for the aperture of the air hole of 2mm order and said outsole.

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[Translation done.]

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DESCRIPTION OF DRAWINGS

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[Brief Description of the Drawings]

[Drawing 1] It is the decomposition perspective view of the shoes concerning the example of this invention.

[Drawing 2] The shoes of drawing 1 do not step on but it is drawing of longitudinal section of the front location of the section.

[Drawing 3] It is the decomposition perspective view of the sole of the shoes of drawing 1 .

[Drawing 4] Drawing 4 (a) and drawing 4 (b) are drawings of longitudinal section which expanded the part which shows other examples of a permeability sheet, respectively.

[Description of Notations]

1 Shoes

2 \*\*\*\*

3 Insole

4 Inside Object

5 Outsole

6, 6', and 6" Permeability sheet

7 Insole

31-41-51 Air hole

61 Epidermis Layer

62 Base Fabric

63 Polyurethane Film Layer

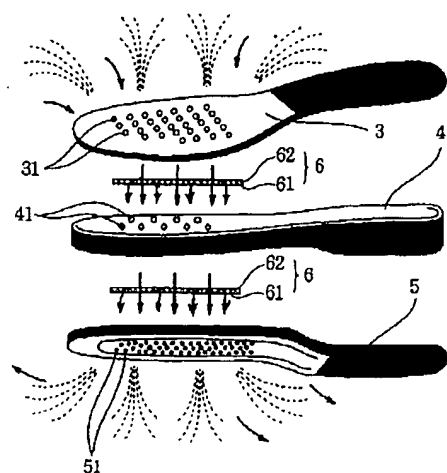
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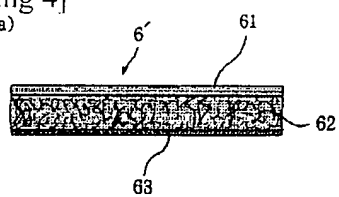
- ## DRAWINGS

[Drawing 3]

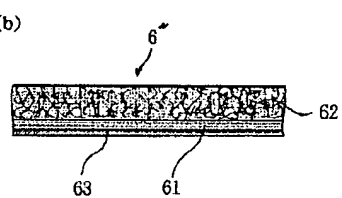


[Drawing 4]

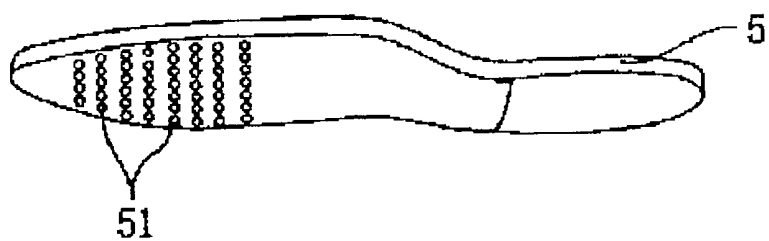
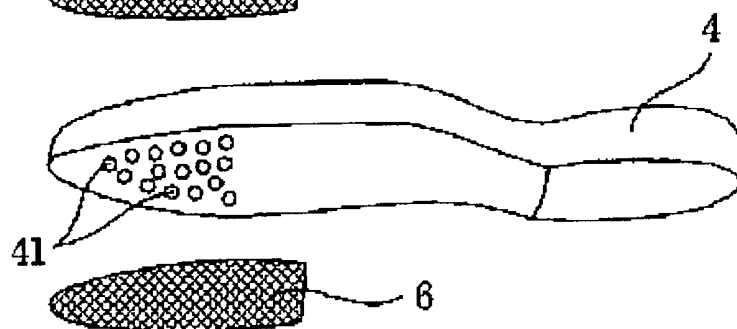
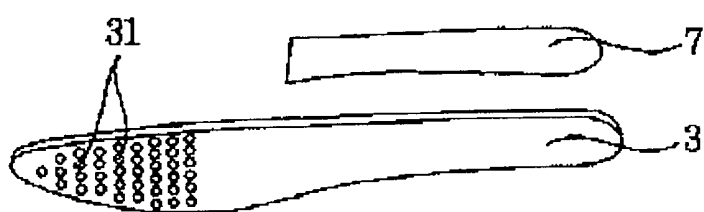
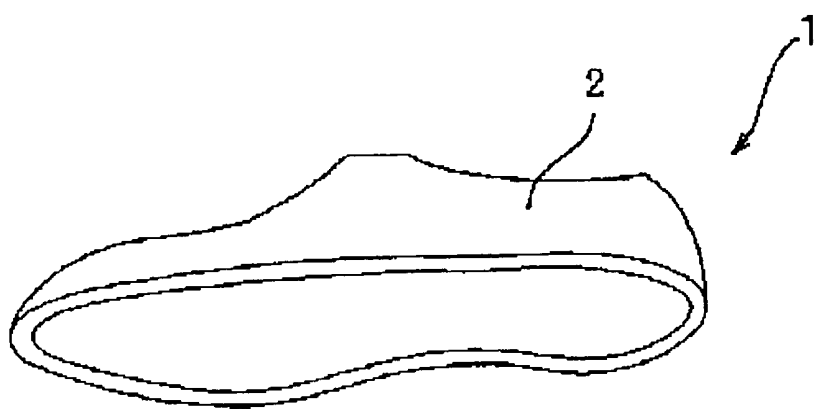
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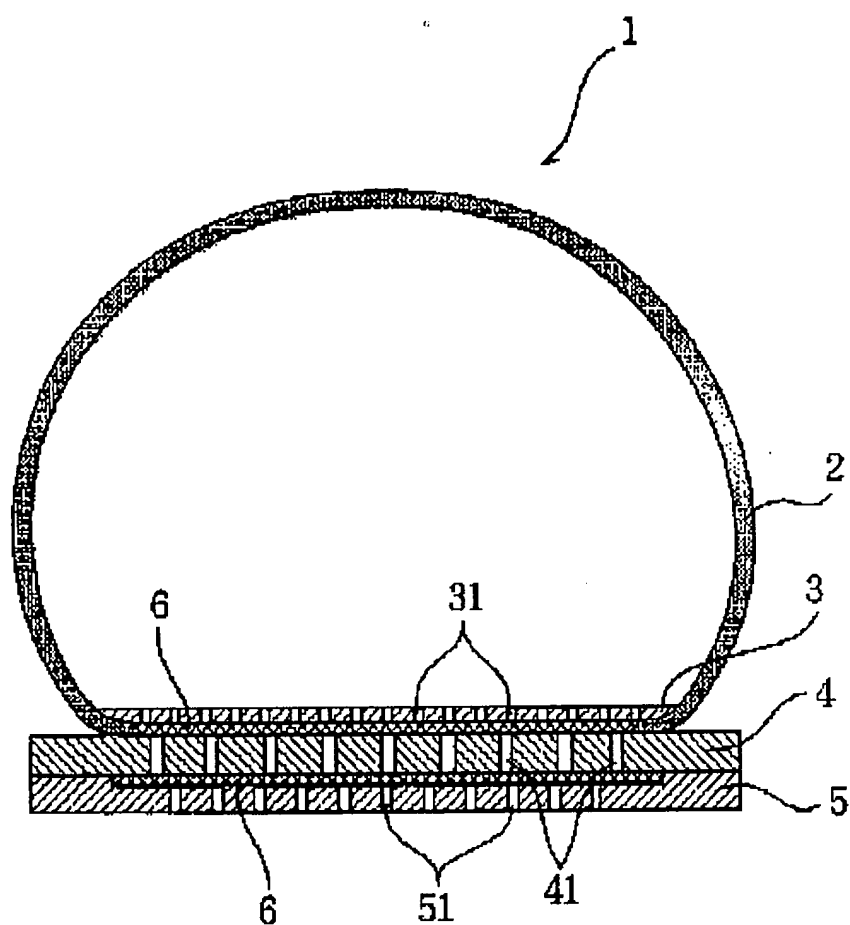


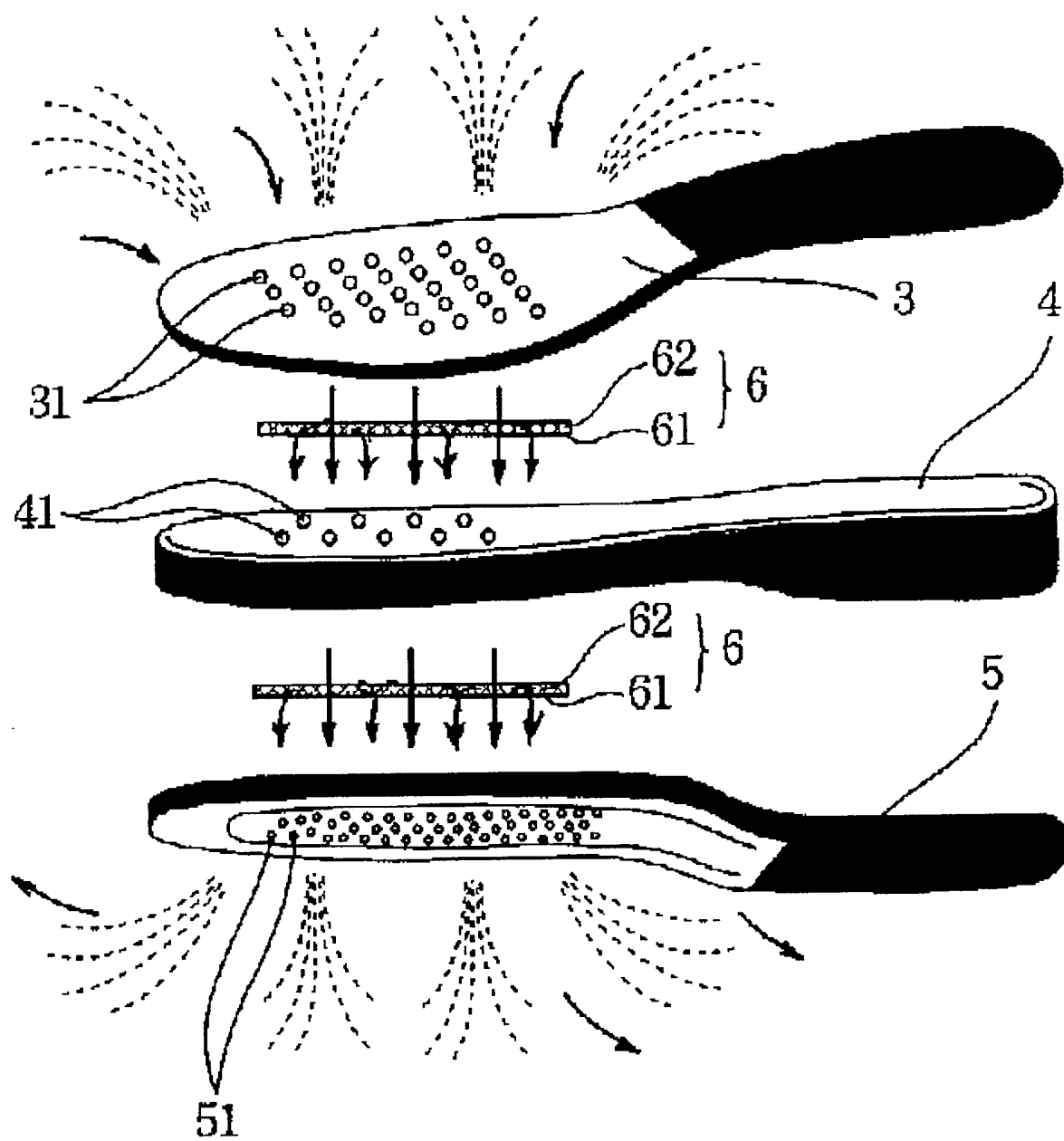
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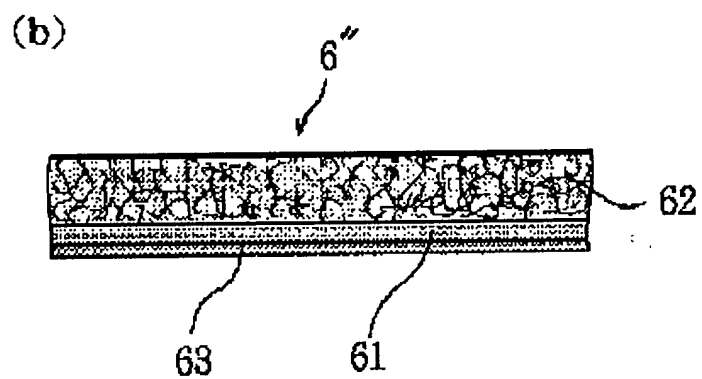
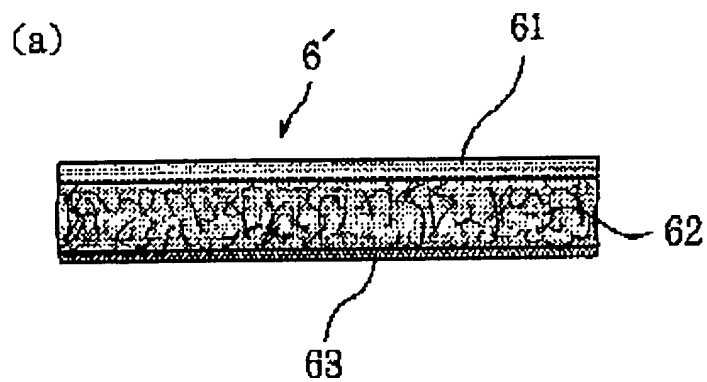
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